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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No. 10/723,291
(Attorney Docket No. GP-303187)

Filed November 26, 2003

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Group 3661

METHOD AND SYSTEM FOR DETERMINING
TIRE PRESSURE IMBALANCES

Examiner Thu V. Nguyen

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Mail Stop Appeal Brief-Patents
Commissioner for Patents
PO Box 1450
Alexandria VA 22313-1450

Sir:

BRIEF FOR APPELLANT GENERAL MOTORS

General Motors is filing this Brief to support the Appeal of Claims 1-10 which the Office Action dated December 28, 2004, finally rejected. Please charge the fee required by this Brief to Deposit Account No. 07-0960.

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I. REAL PARTY IN INTEREST

In this appeal the real party of interest is the assignee, General Motors Corporation.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences.

III. STATUS OF CLAIMS

Claims 1-10 are under final rejection and are on appeal.

IV. STATUS OF AMENDMENTS

General Motors has filed no amendments since the final rejection of December 28, 2004.

V. SUMMARY OF INVENTION

Below is a Brief Summary discussing the objective features and advantages of the invention. Following the Brief Summary is a detailed summary complying with 37 C.F.R. 1.192(c)(3).

A. BRIEF SUMMARY

The present invention is a system and method to determine when any of the wheels of a vehicle are in rotational error through an adaptive measurement of the distance that the wheels have traveled without a calculation of speed for the wheels. More precisely, the present invention provides a system to accurately measure tire pressure imbalance through the measurement of distance by way of digital pulse devices. Moreover the present invention does not use the measured time between digital pulses on and will operate at the lowest possible speed at which a digital pulse may be sensed.

B. DETAILED SUMMARY

Claim 1 recites system of determining tire pressure faults in a vehicle (as described on page 2, lines 1-17; page 5, lines 15-17; and seen in Figures 2-5) comprising: determining a distance a first tire has traveled (as described on page 5, line 26 through page 7, line 2 and page 7, lines 10-19) ; determining a distance a second tire has traveled (as described on page 5, line 26 through page 7, line and page 7 lines 10-19); comparing the first and second distances to determine if a pressure fault has occurred in said first or second tire (as described on page 5, line 26, through page 7, line 2 and page 10 lines 5-10).

Claim 2 recites the system of Claim 1 wherein the distances are calculated using pulse generating sensors coupled to the first and second tires (as described on page 5, lines 26-32), wherein a series of pulses equate to a distance (as described on page 6, lines 11-15).

Claim 3 recites the system of Claim 2 wherein a ratio of pulses is used to determine a tire pressure fault (as described on page 10, lines 5-10 and page 11, lines 2-14).

Claim 4 recites a system of determining tire pressure faults in a vehicle (as described on page 2, lines 1-17; page 5, lines 15-17; and seen in Figures 2-5) comprising: determining distances a plurality of tires have traveled (as described on page 5, line 26 through page 7, line 2 and page 7, lines 10-19); comparing the distances to determine if a pressure fault has occurred in said plurality of tires (as described on page 5, line 26, through page 7, line 2 and page 10 lines 5-10).

Claim 5 recites the system of Claim 4 wherein the distances are calculated using pulse generating sensors (as described on page 5, lines 26-32) coupled to the first and second tires, wherein a series of pulses equate to a distance (as described on page 6, lines 11-15).

Claim 6 recites a system for detecting tire pressure imbalance comprising: a vehicle (as described on page 5, lines 15-19 and seen in Figure 1 as reference numeral 10): a plurality of

wheels coupled to said vehicle (as described on page 6, lines 1-8 and seen in Figure 1 as reference numeral 3); a plurality of sensors operatively coupled to said plurality of wheels, each said sensor sensing one of said plurality of wheels (as described on page 6, lines 1-8 and seen in Figure 1 as reference numerals 9-12), said sensors generating pulses indicative of distance traveled by each said wheel (as described on page 6, lines 11-15); a controller for receiving said pulses generated by said sensors (described on page 6, lines 1-8 and seen in Figure 1 as reference numeral 14); wherein a tire pressure fault is determined by analyzing the distance traveled by each said wheel (as described on page 5, line 26, through page 7, line 2 and page 10 lines 5-10).

Claim 7 recites the system of Claim 6 wherein said plurality of sensors are coupled to an anti lock brake system and said anti-lock brake system transmits said pulses to said controller (as described in page 5, lines 26-32 and seen in Figure 1 as reference numeral 13).

Claim 8 recites the method of Claim 6 wherein a tire pressure fault is determined by analyzing a ratio of distances traveled by at least two wheels (as described on page 5, line 26, through page 7, line 2 and page 10 lines 5-10).

Claim 9 recites the system of Claim 6 wherein speed is not used to determine a tire pressure fault (as described in page 6, lines 11-27).

Claim 10 recites the system of Claim 6 wherein the determination of a tire pressure fault is independent of time (as described in page 6, lines 11-27).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-10 stand rejected under 35 U.S.C. 103 as being unpatentable over Okawa et al. (5,591,906) in view of Sharp (U.S. 5,569,848) and Jackson et al. (6,237,234).

VII. ARGUMENT

A. THE SCOPE AND CONTENT OF THE PRIOR ART: CLAIM REJECTIONS UNDER 35 U.S.C §103

On page 2 of the Final Office Action of December 28, 2004, the Examiner rejected Claims 1-10 under 35 U.S.C. 103 as being unpatentable over Okawa et al. (5,591,906) in view of Sharp (U.S. 5,569,848) and Jackson et al. (6,237,234).

1. Okawa et al. Sharp and Jackson et al.

Okawa et al. Sharp and Jackson et al. are silent with respect to using the distance a tire and/or tires have traveled to determine a tire pressure fault.

Okawa et al., Sharp, and Jackson et al. are all silent with respect to using the distance a tire and/or tires have traveled to determine a tire pressure fault. While it is a principle of physics that speed is a function of distance and time (and that rolling diameter will effect the speed of a tire), the prior art cited by the Examiner clearly uses only wheel speeds to determine a tire pressure fault. Speed is not distance and distance is not speed. A speed measurement requires the additional dimension of time. Okawa et al disclosed in column 4, lines 10-25 that angular velocity is used to determine a tire pressure fault. Sharp in column 6, lines 5-50 uses wheel speed to determine a tire pressure fault. Jackson et al. merely discloses the use of sensors to determine the rolling diameter of a wheel. The fundamental difference between distance and speed is the additional factor of time. Speed based tire pressure systems that use wheel pulses are dependent on fast highly accurate processors with high throughput, as they possibly receive thousands of pulses per second and must within a certain time period convert these pulses (using time) to a speed based calculation. Due to the nature of these speed calculations they are prone to noisy data and microprocessor timing limitations. The present invention is based on the

distance traveled and is not dependent on time. This is an important and fundamental difference between the present invention and the prior art. Okawa et al., Sharp, and Jackson et al., singly or in combination, do not teach or suggest the present claimed invention.

The Examiner is practicing improper hindsight reconstruction, as there is no teaching or motivation to suggest the claims of the present invention. Applicants object to any notion that the prior art teaches a distance based tire pressure fault and assert that the Examiner's statements are highly speculative and are not supported by prior art, as the cited art is completely silent with to using the distance a wheel has traveled to determine a tire pressure fault. A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of the invention to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of hindsight syndrome wherein that which only the invention taught is used against its teacher." *In Re Kotzab*, 217 F.3d 1365. The Examiner has fallen victim to hindsight reconstruction and has also ignored the elements of the claimed invention and failed to explain how and why the claimed subject matter is rendered unpatentable over the prior art and point out where each of the specific limitations recited in the rejected claims is found in the prior art relied on.

Okawa et al. and Sharp clearly teach away from the present invention as they disclose a speed based and not distance based tire pressure fault system. The suggested combination of Okawa et al., Sharp and Jackson et al. by the Examiner is improper, references cannot be combined where the reference teaches away from their combination. See MPEP Section 2145.

Applicants requested in the Amendment of October 13, 2004 that: If the Examiner relies on personal knowledge that the apparatus of the present invention is obvious, Applicants respectfully request support for this assertion in the form of an affidavit that shall be subject to contradiction or explanation by the affidavits of the Applicants and other persons under 37 CFR 1.104(d)(2). The Examiner has not provided an affidavit.

a. Claims 1, 4, and 6

Claim 1, 4, and 6 of the present claimed invention include elements directed to a distance based tire pressure fault. The cited references are silent with respect to a distance based tire pressure fault. Okawa et al., Sharp, and Jackson et al., singly or in combination, do not teach or suggest Claims 1, 4, and 6.

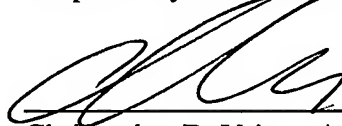
b.. Claims 9 and 10

Claims 9 and 10 of the present invention include elements that specifically negate the use of speed and time to determine a tire pressure fault. The cited references clearly require the use of speed and time with reference to a tire pressure fault. Okawa et al., Sharp, and Jackson et al., singly or in combination, do not teach or suggest Claims 9 and 10.

SUMMARY

Okawa et al., Sharp, and Jackson et al., singly or in combination, do not teach or suggest the present claimed invention. The Examiner has failed to explain how and why the claimed subject matter is rendered unpatentable over the prior art and point out where each of the specific limitations recited in the rejected claims is found in the prior art relied on. Applicants therefore request allowance of independent Claims 1-10.

Respectfully submitted,



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Appendix A

1. (original) A system of determining tire pressure faults in a vehicle comprising:
 - determining a distance a first tire has traveled;
 - determining a distance a second tire has traveled;
 - comparing the first and second distances to determine if a pressure fault has occurred in said first or second tire.
2. (original) The system of Claim 1 wherein the distances are calculated using pulse generating sensors coupled to the first and second tires, wherein a series of pulses equate to a distance.
3. (original) The system of Claim 2 wherein a ratio of pulses is used to determine a tire pressure fault.
4. (original) A system of determining tire pressure faults in a vehicle comprising:
 - determining distances a plurality of tires have traveled;
 - comparing the distances to determine if a pressure fault has occurred in said plurality of tires.
5. (original) The system of Claim 4 wherein the distances are calculated using pulse generating sensors coupled to the first and second tires, wherein a series of pulses equate to a distance.

6. (original) A system for detecting tire pressure imbalance comprising:
 - a vehicle;
 - a plurality of wheels coupled to said vehicle;
 - a plurality of sensors operatively coupled to said plurality of wheels, each said sensor sensing one of said plurality of wheels, said sensors generating pulses indicative of distance traveled by each said wheel;
 - a controller for receiving said pulses generated by said sensors;wherein a tire pressure fault is determined by analyzing the distance traveled by each said wheel.
7. (original) The system of Claim 6 wherein said plurality of sensors are coupled to an anti lock brake system and said anti-lock brake system transmits said pulses to said controller.
8. (original) The system of Claim 6 wherein a tire pressure fault is determined by analyzing a ratio of distances traveled by at least two wheels.
9. (original) The system of Claim 6 wherein speed is not used to determine a tire pressure fault.
10. (original) The system of Claim 6 wherein the determination of a tire pressure fault is independent of time.